

ENDOSCOPE

ABSTRACT OF THE DISCLOSURE

Improved optical devices and methods transmit optical images along elongate optical paths with relatively limited cross-sectional dimensions using an improved objective, relay, and ocular systems. In a first aspect, at least one intermediate image formed within an optical component, rather than being formed in a gap between optical components. In a preferred embodiment, a first intermediate image is formed within glass of the most proximal objective lens, with the first intermediate image extending axially along a curved image location within the glass. The last intermediate image may similarly be disposed within a distal lens of the ocular system. By making use of a first and/or last intermediate image disposed in this manner within a lens, endoscopes can exhibit a significantly larger Numerical Aperture than known endoscopes having similar cross-sectional dimensions. In a second aspect, the ocular system allows independent adjustment of diopters, magnification, X-Y positioning, and rotation orientation of the captured image while introducing minimal aberrations.

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